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On a Modified Meth. for Decomp. Alum. Silicates — Finn & Klekotka — Bur. Stds. Research Paper No. 180

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Square Pegs and Round Holes

By Leonard Wickenden

Chemists must be adaptable. Are chemists too narrow? Let us educate our profession.

I am not quite sold on this idea of pegs and holes.

In the March issue of THE CHEMIST, Mr. D. H. Killefer wrote an article on a plan for chemical employment. It was an intensely interesting article, it was admirably expressed, as everything is that comes from Mr. Killefer's pen, and one had to admit the wisdom of nearly all of it. But when I reached the end, I could not help wondering whether he had gone to the root of the matter.

The purpose of his plan is to keep the square peg away from the round hole. He proposes a series of mental and psychological sieves which will grade the unemployed strictly according to their quality. When he is through with his sifting, I wonder whether he will not obtain a distressingly large fraction of tailings, without quite knowing what to do with them.

When the peg does not fit the hole, is the hole at fault or the peg? Isn't it perhaps because the peg is too incorrigibly square or too uncompromisingly round? Suppose we find a perfectly circular hole, isolate by means of our sieves a perfectly cylindrical peg, and then fit him in snug and tight. What guarantee have we that the hole is going to remain circular? In the industrial world, especially the world of the industrial chemist, holes have a disconcerting tendency to change their shapes. The young chemist gets a job in a paper mill and then suddenly finds himself called upon by the by-products department to be an expert on the refining of cocoanut oil. Or he is engaged as a metallurgist

and becomes involved in a controversy on the preservation of food; or he enters the field of synthetic dyes and finds himself investigating the manufacture of textiles.

Is it not true to say that the jobs which never change their character are, generally speaking, the least desirable jobs—the routine affairs in which one sits on a stool all day and analyzes cement or assays minerals? Mr. Killefer's sieves have their place, no doubt, and by all means let us try to install them. But let us also beware of expecting too much from them. It has been said, with much truth, that we shall never solve the unemployment problem until we have found out how to eliminate the unemployable. I am terribly afraid that most of Mr. Killefer's misfits are unemployables and that the chief function of his sieves will be to separate them from their more capable brothers with greater rapidity than occurs in the ordinary process of haphazard selection.

The term "unemployable" is, of course, an elastic one. A man who is unemployable in bad times may become employable in good times. Mr. Killefer considers it axiomatic that every worker must produce a value for an employer in excess of the wages he receives, yet there must be few organizations which do not contain some employees who fail to pull their weight. They are carried along by their fellow-workers, and in some cases their incompetence is hidden from those who pay their wages. In others, because business, even "big business," is not the utterly brutal and heartless thing it is often said to be, an employee will be kept on the pay-roll for years from more or less sentimental motives. Admittedly, that is an undesirable state of affairs. The position of the employee is precarious, and his presence is unfair to his co-workers upon whose superior talents he is more or less parasitic. But no amount of sifting will eliminate him and his kind from our social order. What, then, can be done?

AS FAR as the unemployable chemist is concerned, it seems to me that the whole problem is closely involved in the larger question of raising the status of our profession as a whole; in other words, of producing better chemists. If we consider our profession critically, trying dispassionately to discover its weaknesses, I think we must admit that too large a proportion of its members are "little" men. They are narrow in their sympathies, they lack a breadth of culture. They do not, in the mass, show up well as men-of-the-world in comparison with the members of the legal or medical profession. These are harsh words and by some will be considered grossly unfair. If they were applied indiscriminately, they would be unfair. There are plenty of chemists who would

be distinguished in any profession, while, on the other hand, there are plenty of lawyers who are pettifogging (and worse) and plenty of doctors who are not entirely admirable. But taken in the mass our profession is not notable for the distinction of its members.

Why is this? Partly, no doubt, because much of the work of a chemist is in the laboratory where his contacts are with beakers and burettes and standard solutions rather than with men. The work of the doctor or lawyer brings him the broadening influence of contact with others. Perhaps, also, the very fact that they will be spared some of the hurly-burly of business attracts to the profession a timid and diffident type. I have sometimes thought, however, that part of the trouble may lie in the fact that we educate our chemist along lines that are too narrow. If his after-life is to offer little in the way of broadening influences, it is all the more important that he get them during his years at college. He might be a better chemist, a finer ornament to his profession, and more successful even financially if, during his college years, he took some time away from chemistry and physics and gave it to the study of the liberal arts. In my more heretical moments, I have thought that a chemist may do better for himself by reading the monthly reviews rather than the technical journals; by listening to a Beethoven symphony rather than to the reading of a paper at The Chemists' Club; by going to a theatrical performance rather than to a lecture theater.

WHAT are the ingredients that make a good chemist? A string of degrees? A six-year college course? Much book learning? All these may help, but not one of them is of prime importance. The most important ingredient is that mysterious compound, so difficult to analyze, so impossible to synthesize, known as a good personality. The second, I would say, is the power to think. The third, the ability to express his thoughts so that others can understand them. The fourth, a breadth of vision controlled by a large fund of common sense. Mix these four together, season to taste with book-learning, and you have a good chemist.

Of these four ingredients, the first is mainly a matter of heredity, but the other three, and the seasoning, must be supplied largely by the colleges. The seasoning they are supplying in liberal quantities, but I am not so sure that they are doing all that could be done with regard to the second, third, and fourth ingredients.

I have said that with the above ingredients, properly seasoned, you will have a good chemist. He will be not only good but adaptable. You are unlikely to hear from him any complaint regarding the shape

of the particular hole in which he finds himself. He will be busy shaping himself to fit the hole or, still more likely, shaping the hole to fit him. If any of his co-workers suggest to him that conditions are not all they should be, he is likely to retort in the words of the immortal Bill, "If you know a better 'ole, go to it!"

Habit—First Aid to the Chemist

By Franklin D. Jones

WE SAY, "A man is the slave of his habits," but we do not often recognize how much our habits are our efficient slaves. It takes intelligence to form habits, and we know that one of the distinctive marks of an idiot is inability to learn. What does this have to do with a chemist? Well, it seems the fashion today to examine fundamentals critically, and in chemical work what is more fundamental than the chemist himself, and his ways?

Learning might be defined as the process of profiting from experience, either personal or second-hand. We all learned how to acquire knowledge in a more or less haphazard fashion as we went to school. When the results of our psychologists' experimenting are examined and applied, it is rather a shock to find out how wasteful and ineffective our empirical methods of learning are. If you think your own method of acquiring information is good, read some of Dr. E. L. Thorndike's papers. More entertaining, and certainly worth while, is Pitkin's "The Art of Learning."

The constant threat of unemployment or its actual experience makes it necessary for the chemist to be able and ready to master new fields with the maximum of speed and efficiency. And the established chemist cannot afford to rest on his oars, for a college education is only a preliminary requirement today.

The commonest method of learning is reading, but how few people know how to read! I know an electrical engineer who handles most of the research for a certain public utility. If I were a lip reader, I could always tell what he is reading, for he pronounces every word to himself as he reads. With such a habit, he has to read a newspaper just as slowly as a difficult technical paper. Some people read by letters, some by syllables, others by words, and the faster by phrases and sentences. What a difference in speed between the two extremes!

Curiously, the way to learn to read fast is to read fast. The mechanical style and rate of one's reading can be improved amazingly. Whether the quality and taste of your reading can be bettered is much a matter of the individual himself. Walter B. Pitkin has written, "The Art of Rapid Reading," which covers the subject adequately; and a perusal of this book would interest anyone who likes to read.

Reading calls up the old saw, well-known to the college professor, that the senior class is easily distinguished from the freshman class by the high percentage of seniors who wear glasses. And eyestrain and bad lighting are blood brothers. It is general knowledge that better illumination can jump factory output—quality and quantity—and increase merchandise sales. On such points the electrical engineers have fairly definite standards. But last fall the Pennsylvania Chapter of the A. I. C. attended a lighting exhibit of the Philadelphia Electric Company, and the illuminating experts were unable to give any idea of what constituted acceptable lighting standards for chemical work or reading other than the elimination of glare. Dr. Donald Laird in his book, "Increasing Personal Efficiency," gives ten foot-candles as the desirable illumination for reading or close work, with the further condition that the work or book must be evenly, uniformly lighted with no direct reflection striking the eye. He gives formulas for deriving the power of the lights required for such a standard. In a 12 by 15 room, for example, 450 watts would fill the bill for direct lighting, or 800 watts for indirect lighting. This may sound excessive, especially in view of the 100 to 200 watts usually in use. Dr. Laird justifies it by the freedom from eyestrain.

Rest and sleep are not always used as well as they might be. The introduction of rest periods into tiresome work has resulted frequently in amazing jumps of output. Many of us have noted how long hours dull and slow up a chemist in his work. The NRA in shortening hours has probably improved quality and quantity far more than we have realized.

Then there are our personal habits—the rituals that we go through every day—health habits, eating, drinking, etc. Are they anchors or helpers? The Laird book mentioned above can be used as a guide for self-appraisal, and in it are given a list of good books on practical psychology that one can profit by reading.

Self-appraisal and criticism are entertaining and, if taken seriously, may be of value. May you enjoy overhauling your habits, Fellow Chemist!

NRA and the Chemist*

By C. C. Concannon

Background of the NRA. Chemists ought to observe the codes being prepared by individual industries. Chemists should also prepare their own code.

YOU have asked me to discuss the NRA in its broad implications and likewise to offer suggestions in this connection which may point the way to economic improvement of the professional chemist. In view of the fact that The American Institute of Chemists has for its primary purpose the promotion of the social and economic welfare of the chemist, whether in industry, pure science, or in teaching, it is peculiarly fitting that under the auspices of this Institute the chemical profession should consider what part it can best play in forwarding the aims of the Administration, and what chemists may expect of the Recovery Act from the Administration. It is a fact that there are thousands of professional men who are suffering from drastically reduced incomes, and there are many even in dire need. You are anxious to help, just as are we in Washington, and for that purpose I am here tonight to give you such information I can on what is a highly involved and rapidly moving phase of present-day history—the NRA.

The first question which naturally arises in a situation of this kind is "What is it all about?" Why did Congress pass the National Industrial Recovery Act, known as NIRA, and why has President Roosevelt set up the National Recovery Administration, known as NRA, under the direction of General Hugh Johnson? These are simple questions in themselves, but they are not so easily answered if all the details involved are to be reviewed. We are all acutely conscious that we have had a de-

* An address before the New York Chapter of The American Institute of Chemists, September 22, 1933.

pression, that bad times are with us, and we know that we are faced with a crisis in the life of our country affecting our social structure and the well-being of everyone. Briefly stated, many millions of our people are out of work and are suffering intensely because of their inability to find employment; and the immediate problem is to put the unemployed back into gainful occupations.

SEVERAL years ago economists, sociologists, students of public affairs and those who were following developments throughout the world, were beginning to realize that something fundamental was wrong with the scheme of things. There was a grievous maladjustment, with production far outrunning in its development our methods and means of distribution. The Machine Age had arrived at a critical period in its evolution, and rapid development of power and machinery brought about overexpansion, overinvestment, and overproduction in many lines.

We have been producing more and more finished goods in our factories, and our farms have been extensively worked to the end that our markets have received more than our consumers could purchase. The rapid advance of science has played an important part in this distortion of economic relationships, and we have had intercommodity competition as well as interindustry competition reaching ruinous proportions. "Profitless Prosperity" was a statement frequently heard but seldom understood, and it was not until America's unemployed workers reached millions that the gravity of the situation forced us to undertake measures that might be employed only in a time of national emergency. We are now struggling to readjust ourselves materially and to restore employment and purchasing power. There is general recognition that the answer must be found in a control that will shorten hours of labor and better distribute available work, thereby enabling workers to profit from the improved implements of industry.

There are two very definite goals to be attained. The first is the relief of unemployment. That is our greatest need at the moment. We must not—we cannot pass through another winter with millions unemployed, as was the case last winter. All emphasis is to be placed upon putting men back to work before anything else is undertaken.

The second goal to be attained is to create some sort of economic structure whereby business will be permanently improved and the conditions that have brought us to this period of economic crisis shall be remedied once and for all. Without purchasing power there can be no market for the products of the farm or of the factory, and until there is

real purchasing power on the part of our farmers, our workers in industry, and citizens throughout the land, there can be no prosperity. Real prosperity cannot be attained so long as productive capacity greatly exceeds, as it now does, purchasing capacity. This condition, which has been in effect for the past several years, gradually becoming more acute, spells depression, and it is to overcome this that the NRA has been set up.

The underlying philosophy of the Administration and the NRA is to help business to help itself, to the end that reemployment may be most expeditiously facilitated, and that we may again enjoy the prosperity to which our people are entitled.

AND now let me briefly review a series of events leading up to the present situation. After numerous attempts, thoughtfully planned and seriously undertaken, were initiated, it became increasingly evident that expedience and temporizing would not avail, and the people of the country issued their mandate that something must be done. One of the well organized programs of the past designed to remedy the situation, particularly with regard to unemployment, was the "Share-the-Work" Movement, directed by Mr. Walter Teagle. This movement was just what its title signifies, and had some success, but it was everywhere evident that brand new theories of social organization were necessary.

Probably the first definite step forward was a bill introduced in Congress by Senator Hugh Black of Alabama. This measure was known as the "Thirty-Hour Work Week" bill. It limited the hours of labor to anyone employed to thirty hours per week. The obvious result of this proposed legislation would have been the end of all unemployment, but there were many other factors involved, and this simple but arbitrary limitation of hours of labor to thirty a week, though it passed the Senate, failed of final enactment and did not become law. The Black Bill, however, served an extremely useful purpose because it focused attention actively upon the problem; and events then began to happen in rapid succession. Secretary of Labor Perkins came forward with suggestions to make the bill more flexible so that different conditions in varying industries could be taken care of, and it is quite likely that the idea of government control of business came into active being at about that time. At any rate, the Administration took the matter up in vigorous fashion, and various proposals were made by Senator Wagner of New York which eventuated in the National Industrial Recovery Act.

It should be realized that business was in a grave condition when the National Industrial Recovery Act was passed. Business men were every-

where seeking relief. The best minds in the Administration, together with our chambers of commerce and our trade associations, were working together to find a solution of our difficulties and a way out of the depression. Much was said about the Sherman Anti-trust Act and the need for permitting business men to get together for the purpose of putting an end to cut-throat competition and other unethical and disastrous methods of business procedure that were spelling ruination. Business men were solicitous at that time to have the Government do all that it could to help the situation, and the result was a partnership between government and industry whereby some of the obstacles to concerted action might be at least temporarily overcome in the interest of business recovery. During recent weeks business has substantially improved; and with betterment of conditions, the ardor of business men for participation of the government in their affairs has somewhat cooled. But the partnership between business and the NRA is something which has already been formed and is something which must be continued for the time being if we are to have lasting prosperity.

MUCH that will go down in history as epoch-making has happened since President Roosevelt signed the National Industrial Recovery Act making it law on June 16th. Title I—that is, the first part of the law—has to do with reemployment in industry, and is carried on by the NRA under General Johnson. Title II of the law was designed to create employment through a vast program of public works. Title II is not of particular interest to the average individual, but the first part of the act administered by NRA is of vital consequence to employer, employee, and consumer. As originally designed, it was expected that all industries would file codes covering maximum hours of labor, minimum wages, and other features having to do with business ethics, with emphasis on elimination of cut-throat competition. The textile, coal, steel, petroleum, and automobile industries as great employers of labor were of primary importance. Codes of fair practice for these industries have been put through the NRA mill, have been finally approved by the President, and are now the law of the land regulating the specific industries involved.

Many industrial codes at the present moment are in the process of formulation. More than 4000 national and local codes have been received of which total 1000 are of national scope. As can be imagined, the task of reviewing these and of putting them to the various tests of fitness set up by the NRA is enormous. To speed up matters and to take care of unorganized small employers a blanket code was promul-

gated whereby the benefits to be derived from NRA are quickly and generally made available. Thus the President's Reemployment Agreement, known as PRA, was brought into being, and at the present time the greater part of the NRA's efforts are devoted to bringing as many industries as possible under the President's Reemployment Agreement.

The Blue Eagle, symbol of code compliance, is already well known throughout our land, and the means of obtaining the insignia by those entitled to it have been widely published. Likewise, the significance of the movement is appreciated, certainly here in New York, and all realize that consumers as well as employers must do their part.

UP TO THIS point I have discussed my subject in a general way leading up to where I may address you specifically as scientists, technicians, and professional men. What is the mutual relationship of the chemist and the NRA? The answer is not clear-cut, and what may seem to be the case today will doubtless be altered or modified as time passes.

The National Industrial Recovery Act makes its declaration of policy in Section I.

"A national emergency productive of widespread unemployment and disorganization of industry, which burdens interstate and foreign commerce, affects the public welfare, and undermines the standards of living of the American people, is hereby declared to exist. It is hereby declared to be the policy of Congress to remove obstructions to the free flow of interstate and foreign commerce which tend to diminish the amount thereof; and to provide for the general welfare by promoting the organization of industry for the purpose of cooperative action among trade groups, to induce and maintain united action of labor and management under adequate governmental sanction and supervision, to eliminate unfair competitive practices, to promote the fullest possible utilization of the present productive capacity of industries, to avoid undue restriction of production (except as may be temporarily required), to increase the consumption of industrial and agricultural products by increasing purchasing power, to reduce and relieve unemployment, to improve standards of labor, and otherwise to rehabilitate industry and to conserve natural resources."

There are many references in this declaration of policy which are of interest to all workers, the professional man included. Another paragraph of interest in the Industrial Recovery Act under "Agreements and Licenses," Section 4 (a) states in part that the President "is authorized to enter into agreements with, and to approve voluntary agreements

between and among, persons engaged in a trade or industry, labor organizations, and trade or industrial organizations, associations, or groups, relating to any trade or industry. . . ."

I take the foregoing as being broad enough and/or sufficiently specific to identify and include the chemist and other professional men.

In the President's Reemployment Agreement, sometimes known as "The Blanket Code," or PRA, provisions are contained for maximum hours and minimum wages for various classes of employees, and among others are specified accounting, clerical, banking, office, service, and mechanical.

In Paragraph IV of the Agreement it is stated that the maximum hours which apply to various classes of employees, just referred to, do not apply to "registered pharmacists or other professional persons employed in their professions." An explanatory sentence following the foregoing statement reads as follows:

"Professional persons, like doctors, lawyers, registered pharmacists, and nurses, may be employed without any limit of hours."

Of particular interest in this instance are certain interpretations of the President's Reemployment Agreement which have been issued. Interpretation No. 6, Concerning Employments Covered by the Agreement states:

"The following groups of employment are not intended to be covered by the President's Reemployment Agreement:

1. Professional occupations."

Interpretation No. 19, "Concerning Professional Persons," reads thus: "The following are included among professional persons within the meaning of paragraph 4:

Newspaper reporters, editorial writers, rewrite men, and other members of editorial staffs.

Internes, nurses, hospital technicians, research technicians."

It is obvious from the foregoing that professional people, that is, chemists as such, are not subject to the NRA. Citations are readily available from various industrial codes wherein chemists and technicians are exempted from the provisions of the code of particular industries.

NRA Bulletin No. 4, an official statement of the Blue Eagle Division of the NRA, to which I am referring for many of the foregoing quotations, contains the following statement: "There is nothing to prevent an employer of labor outside of trades and industries, any professional man or organization, or any non-profit organization, from signing the President's Reemployment Agreement and conforming to its provisions. This does not mean, however, that there is any compulsion to do so,

other than that resulting from a desire to cooperate, when appropriate, with a general program of shorter hours and higher wages. To the extent that labor is employed in occupations comparable with trades or industries, it is, of course, desirable that similar conditions prevail. This applies to professional men or organizations, hospitals, educational institutions, or any non-profit organizations."

The foregoing statement is significant in that professional men or organizations may come together for concerted action to support the NRA and to derive therefrom such assistance and benefits as may be possible.

IN CONSIDERING the position of the chemist or other scientific men, so far as the NRA is concerned, it seems to me that there are two avenues of thought to be investigated. When the chemist is employed by a firm, he becomes a part of that firm and is naturally identified with the industry with which the firm is associated. The chemist is then subject to the rules and regulations and to all restrictions and exemptions that may appear in the code of fair practice set up for that particular industry. This being the case, the obvious thing for chemists to do individually or as a group is to observe carefully what is written into various codes concerning chemists and men in technical capacities.

There seems to be a tendency in drafting industrial codes to exempt employees who are of a professional or technical class from maximum hours. The immediate question that should arise in the mind of every chemist is: What will be the result of these exemptions and exceptions? Will they favor the chemist or will they be a detriment and perhaps a cause of monetary loss to him?

Obviously chemists or professional men occupying positions as executives, or who are in other situations far above the working bracket in which the NRA operates, are excluded from limitation of working hours. Certainly the majority of chemists are not subject to the intent of the NRA, but doubtless there is a considerable group which may be involved and which may be missing an opportunity to improve their positions, through these professional and technical exemptions. Is it not a fact that in a period of depression men of relatively high technical training and experience may find themselves in distressed circumstances and may be obliged to accept whatever may be available in the way of employment? These unfortunates, if there are any, should be protected, and likewise the young men fresh from school and other beginners who may be striving to advance along the technical road to success in industry.

Let me refer to the proposed code of fair competition for the chemical

manufacturing industry, the public hearing of which was conducted a week ago. Article II states that limitation of hours of labor shall not apply to any person in a technical capacity (not to include skilled operating labor). Mr. Bell, President of The Chemical Alliance, in proposing the code indicated very clearly that the employment and pay-roll situation in the chemical industry is in an extremely satisfactory condition in so far as the technical man is concerned, it being evident that unemployment among chemists is largely due to industries other than the chemical industry.

Both wage and hour provisions were discussed at some length, and General Williams, deputy administrator conducting the hearing, explained that the minimum wage provision of the act is intended to apply only to the lowest class of common labor. Dr. Eckles, the Labor Adviser, agreed with objections raised against the hour provision and argued that technicians of the lower class should have their hours limited. He said that minimum wages for such workers were outside the discussion, and he agreed that chief chemists and research men must work long hours at times, but he suggested that chemical manufacturers lead other technical industries in limiting the hours of the lower classed technical workers. Mr. Bell responded to this suggestion in such a way that there should be no doubt about the intent of the chemical industry to protect technical workers in whatever class they may happen to be.

THE foregoing may be accepted as an excellent example to follow if the chemist wishes to do his part and wants to derive all benefit possible from the NRA. Chemistry as a profession is not covered by the NRA because professions as such have not yet been brought under the Blue Eagle, nor are they subjects for any contemplated codes. This is entirely aside from the chemist in industry who is an employee of the particular industry and will be covered by whatever industrial code may apply, and is likewise aside from consulting chemists and chemical engineers who as a group have quite in order filed their own code of fair competition. It is obviously the part of wisdom and fitting that the chemist should carefully guard against the indiscriminate application of code exemptions which may be detrimental to him in the near future and should plan either through the development of his own code or by some other means to be prepared for whatever may develop in time to come.

Let me say that cooperation is not a sentiment; it is an economic necessity. You as professional and technical men must work for every individual whatever his status may be in your profession. The morale

of your group consciousness must be maintained and strengthened The safety and progress of our country depends in large measure on the chemist and the chemical industry, and the chemist should lead the way in all forward movements in this, the chemical age.

To Limit or Not to Limit

By Cyrus G. Dunkle

Ought the number of chemists be restricted? The argument against restriction. Choosing the best material for a limited profession. Facts for young chemists.

THIS title expresses the basis of many discussions which have been agitating chemists for some time. These discussions assume varied forms. They may concern licensing, or compulsory codes, or suggest that some measures be taken to restrict the annual flow of thousands of enthusiastic young technicians from our institutions of higher learning. Yet whatever form they take, these discussions all revolve about one central idea: that of limiting the numbers admitted to the practice of the profession.

The question of whether "to limit or not to limit" concerns all the engineering professions in general; it should be of particular interest to chemists, for, unorganized economically, they are in an even more helpless position than most of the others. The form that such limitation might take, whether a licensing of chemists or the cutting down of enrollments at technical schools by means of economic or scholastic barriers or otherwise, is subordinate to the main question of whether any form of limitation is advisable at all. If you want badly enough to do a thing, you can usually find the way to do it.

It is only too evident that of the flood of technical graduates annually released upon an already depressed market, no more than a small proportion will be able to pursue technical careers. Further, and more important, even they will be able to do so only by displacing older men. We are told by employment agencies that there is an ever-growing and permanent reservoir of experienced but unemployed technical men whose chances for reemployment are hopeless. Their years of special-

ized training are discounted by improvements in the arts, some of which they themselves may have brought about, and by the sort of financial obligations which makes it impossible for them to compete economically with a horde of recent graduates striving at any cost to be among those fortunate sons to land a job.

Nevertheless, so fearful are chemists of losing their amateur standing, that any suggestion that technical men follow the example of doctors and lawyers and do something to discourage prospective competition is met with horrified astonishment. The burden of the protest has been about as follows: "We are scientists—torch-bearers in the darkness of human ignorance. Our message is to anybody that will listen to us. The development of the science will suffer if we try to restrict the knowledge and practice of it in any way. There is no over-supply of chemists. As a matter of fact, there are not nearly enough of them. If humanity could be induced to make every possible use of chemistry, there would be places for ten times the number of chemists now employed. And in any case, a good man can always find a place. It is sometimes extremely difficult to find a suitable man for a certain post. Let us, therefore, ballyhoo research to the skies, and do all we can to induce youths to become chemists, so that the scientific viewpoint will become popularized, and the science of chemistry will be advanced rapidly at all points. This will increase the demand for chemists!"

THIS advice has been followed, and what is the result? Today, any advertisement of a chemical position brings a flood of replies from men of astonishingly high qualifications. A corporation scouting the senior classes has a wealth of excellent material from which to pick and choose—the lucky ones being informed, in at least one case, that they have been selected for the honor of starting at the customary "nothing a month" for six months, with the understanding that they have exactly a fifty per cent chance, at the end of that time, of being retained permanently. "What? You don't like the prospects? Oh, very well, then; good day . . . Next!"

Contrast this situation with the average man's difficulty in obtaining competent legal advice or adequate medical services as a reasonable figure. Granted, that lawyers and doctors have their poor years; but the moderately successful lawyer or doctor does seem to be busier, on the whole, than the moderately successful chemist. Humanity, it seems could use more of them. But do doctors and lawyers throw wide the doors to applicants for the practice of their professions? Do they try to get young men interested in law and medicine, thinking thus to

increase the demand for doctors and lawyers? They do not. Yet it would not appear that the progress of medical science in America has suffered. There are those who would argue that licensing would involve a loss of "professional standing." Yet, despite the sporadic claims of pharmacists, photographers, journalists, and morticians, to say nothing of chemists and engineers, law and medicine remain the two, and only two, recognized secular professions.

The argument that work can ever be found for ten times the present number of chemists will find plenty of unkind skeptics to dispute it. No one, on the other hand, will deny that human beings need bread and meat. It is universally admitted that there is an actual lack of these necessaries in some quarters. Yet we see the actual destruction of these commodities condoned, and the limitation of their production encouraged. A farmer may get a bonus for destroying a wheat surplus, even though nobody thinks of giving the unemployed a bonus for demolishing a bread surplus.

This is not to say that such destruction is sound economics. That is beside the point. The fact remains, it is being done. It has been a universal custom, even more prevalent, for producers to limit their output with the object of maintaining a profitable price. We may regret the waste involved. Just so, we may regret that a policy of limitation of the numbers of chemists—a sort of "professional birth control"—would shunt much good human talent away from chemistry and into other fields. Nevertheless, what is the use, after all, of training a lot of technical recruits with no other prospect than that of marking time or working in conservation camps until humanity wakes up to its serious need for more and yet more chemists? We must take things as we find them. We can hardly hope to reform the world. Why, therefore, should chemists, alone of all others, insist on retailing their output in a demoralized market.

THAT the numbers of chemists will be limited in any case there is no reasonable doubt. The experience of the employment agencies, earlier referred to, shows conclusively that the market is limited. It is for the chemists themselves to decide whether the necessary limitation in personnel will take place under their own direction or be thrust upon them. Understand, it is not the chemists who would be doing the limiting; that is something which is done by forces beyond their control, and they cannot prevent it; they can, however, decide at what stage in a technical career the rejection of the unfit will take place. It would seem most logical to eliminate, at the very outset, those candidates who do not

appear to have the mental and material resources to justify the very considerable time and money investment required for the proper preparation for a technical career. Is this not more humane, and does it not conduce far better to the progress of the science of chemistry, than to allow valuable talent and training to be scrapped prematurely because of excessively rapid turnover and ruinous economic competition?

Will Rogers recently remarked that in view of the threatened overproduction of pork, it will be necessary to teach the hogs birth control, as it is feared that they don't know much about it. Are chemists going to let their destinies be handled by outsiders in a similar manner or will they show more intelligence than Will Rogers credits to the above-mentioned animals. Will they face economic facts for once, and take their personal interests into their own hands? Possibly this cannot be done until a strong economic organization of chemists is developed. Yet the individual chemist can do much good if he will only take the trouble to correct some of the misinformation which has been broadcast during the past few years, and give youthful aspirants to technical careers the facts in the case. These are: that the market is limited, that the requirements demanded of successful candidates for technical positions are much more severe than is even now generally realized, and that it is a waste of time to expect a chance to pursue such a career without a Ph.D. degree. The sooner these facts are brought home to them the better for the economic interests of all concerned, and for the development of the science of chemistry as well.

Are There Too Many Chemists?

By William Foster

NOT long ago the writer was discussing with the head chemist of the Carnegie Steel Company at Youngstown, Ohio, the present condition of the iron and steel business. In the course of the conversation he said,

"The Valley (meaning the Mahoning Valley) is filled with chemists who are walking up and down looking for employment."

I venture to say that most of these chemists are recent graduates of our colleges, universities, and technical schools.

At present the profession of chemistry is very crowded, especially at the bottom. Competition is most keen. The situation is somewhat similar to that in Germany, where the profession has been crowded for many years. In that country promotion has often been slow, both in the academic and industrial fields. A most rigid and thorough training has been demanded.

In our country at the present time there is a fair demand for very highly trained and competent chemists—analysts, and organic and physical chemists. A call recently came for a *specialist* in the field of organic chemistry, at a salary of $225 per month; but our last qualified man was placed with a strong corporation several months ago. He is happy in his present position and is well paid, and could not be induced to give up his post for a salary of $2700 per year.

It is extremely important to turn out thoroughly trained men. Merely completing an undergraduate course is not sufficient. Young chemists who wish to advance and to be in position to command good salaries should do two or three years of advanced work in institutions of the highest rank. "There is always room at the top," but the bottom is usually crowded. When industrial conditions improve, there will be better opportunities for young graduates who have neither the time nor the funds for doing graduate work.

THE CHEMIST might do a real service to young chemists by giving information, if possible, concerning the most promising employment fields for those adequately trained. There is usually a demand for highly trained and competent chemists who have real ability, ambition, and attractive personalities.

The older chemists are dropping out of the ranks, and their places must be filled. This gives hope for the younger generations. But they must be thoroughly prepared to accept the responsibilities.

The Institute and the NRA

By Frederick Kenney

NRA strives for both security and freedom. The chemist should use this opportunity to insure fair competition and just compensation.

THE people in this country are all vitally interested in the efforts being made by our government to combat the depression; and the National Industrial Recovery Act is one of the factors being employed to improve conditions.

The particular feature of the recovery program which distinguishes our American adventure from various comprehensive plans of economic rehabilitation now being tried in other nations is that our program has the double objective of freedom and security. Every section of the law clearly shows that it is the intent of the Congress of the United States not to purchase security at the price of freedom.

The objectives of the law which apply to chemists may be stated as follows: to provide for the general welfare by cooperative action; to induce the united action of employee and management; to eliminate unfair competition; and to improve the standard of employees.

Codes of fair competition are drafted by associations and impose no unfair restriction on admission to membership. In addition to codes, agreements may be made between groups affecting either trade or employee relations. It should therefore be very apparent that the chemist ought to have an organization to take the initiative in safeguarding his interests; and in my opinion The American Institute of Chemists should assume this responsibility.

It is agreed by those who have studied the subject that the whole scheme of self-government in industry will fall to the ground without employee participation. It was and is equally evident that without

employee participation there would result neither security for the employer and the investor nor freedom for the worker.

If employees are fully and adequately organized and accept the responsibility and the obligations which must go with power, then the employer will be assured of harmonious and continuous operations of trades and industries. Likewise, stability of employment can be provided, and payment of the best possible wages can be assured, through maintenance of contractual relations based on stabilized conditions of production and marketing and accurate knowledge of such conditions, thereby gaining for the employee both freedom and security.

In modern enterprises it is impossible to maintain satisfactory employee relations or fair competition between industrial units without some form of employee organization. It is unwise to assume in these days of advanced education and widespread information and misinformation about commercial questions that employees will simply accept the decisions of benevolent employers, or that they will regard the fixing of wages and hours and working conditions as matters over which they should have no control.

THE position of the chemist in this structure is vastly different from other types of employees because of the fact that his work enters into many industries which in turn have many and varied conditions. It is necessary for some organization to act as a coordinator in the interest of the employee where the fundamental basis is uniform and the incidental operations are varied.

The chemist should be deeply interested in the purpose of the act because he has to contend with some of the conditions set forth among its objectives. These conditions vary with the field of operations. It is probably true that within the chemical industry itself conditions are better than in other industries and likewise it is true that many manufacturers and producers are acting in an equitable manner. It cannot be disputed, however, that in many instances unfair methods are being followed to the detriment of the chemist by the employment of men who are not fully qualified, especially by so-called small producers. It likewise must be apparent that many of the commercial laboratories throughout the country are unfair, either employing unqualified men or paying low wages. What would you, as a chemist, think of a laboratory that would offer not only to sample a delivery of coal but also give you a calorific and proximate analysis for five dollars; or do a fat determination in cream (Rose-Gottlieb method) for sixty cents?

How often do we hear also of the exploitation through chemical re-

ports of various commodities and materials. In some instances we, as chemists, know that they have little or no value, but unfortunately the public is not in a position to appraise them. The function of The American Institute of Chemists I believe at this time should be to assume leadership in the present problem of chemists and to define qualifications for the various duties which may be assigned to employees performing chemical work and to promote the establishment of equitable compensation values for each type of duty.

Many people feel that the NRA is interested only in establishing minimum pay and maximum hours in each industry, but I disagree with this thought. Already some attention has been given to maximum salaries paid directing executives. I believe that the establishment of a minimum wage is, however, the most important factor, as it establishes a basis for that gradation of all compensations in industry which must be established for an equitable status of compensation for all employees.

I sincerely hope that the Institute will not overlook its golden opportunity.

Pure Science

WHETHER he knows it or not, every farmer in the United States is farming differently today—and better—because of the scientific discoveries resulting from state and Federal appropriations. The average hour of man labor and the average acre of land is undoubtedly twenty to thirty per cent more productive today because of this work.

I appreciate that it is often difficult for the layman to see any earthly use in many of the things that scientists do and talk about doing. Of what value is it to you and to me, for instance, for a man to spend his time trying to discover the workings of nature? How can a man—we are inclined to say—do anything useful unless he works directly with the things that we all can touch and see, that we know have practical utility?

Well, when confronted by questions like that, I think of men like Faraday and Mendel, and some of the scientists in the employ of the Federal Government. About a hundred years ago in England Michael Faraday was what we might call an experimental philosopher. He never concerned himself with the invention of machines. His sole aim was to learn something about the workings of nature. He discovered electromagnetic induction; and without that discovery, we would today have no means of putting electrical energy to work for us.

—HENRY A. WALLACE, U. S. Secretary of Agriculture.

Steps Preliminary to Filing a Patent Application*

By Charles W. Rivise

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Advice from a patent attorney on first steps in invention. Study of patents should be made first. Analyzing inventions. Choosing an attorney.

IT IS VERY important that the application for patent be filed as soon as possible, particularly in arts that are relatively active. The law assumes that the one who is first to place his application on file in the Patent Office is the first inventor, and the burden of proving otherwise is far from being an easy matter. The inventor is, however, cautioned against rushing to the Patent Office with an incomplete invention, or before he has had ample opportunity to ascertain the full significance of what he has invented. Not that the invention must be brought to a high state of development in its mechanical details; but without proper study and investigation it is rarely possible so to describe and define the invention as to secure to the inventor the full scope of the protection to which he is entitled. A study of many litigated patents clearly indicates that a large proportion of them are poorly drawn because the attorneys were erroneously or imperfectly informed as to the inventions sought to be covered or as to the relationship to other existing means for accomplishing the same or equivalent results.

In this connection it may be stated that if an inventor first obtains a patent of broad inclusive scope, he may later be able to secure narrower

* Based in part on Chapter II of Mr. Rivise's forthcoming book "The Preparation and Prosecution of Patent Applications."

patents covering the application of his basic conception in restricted portions of the broad field. But if he obtains a narrow patent in the first instance, no subsequently filed application of his can result in a broad basic patent on the invention. And this is so, even if the broad patent would have been justified if its application had been filed prior to the application which matured into the narrow patent.

Determining Scope of Invention—Patent Searches

To understand fully the significance of his invention and its scope, the inventor must view it in its true relation to other existing devices of the same kind. An investigation of the patent and technical literature is always indispensable in this connection. Searches of the records of the Patent Office are usually made to determine the advisability of applying for a patent. Such investigations are termed preliminary searches, and the patents uncovered give the inventor some idea of the scope of his contribution and enable him to prepare and prosecute the application more intelligently. The Patent Office has copies of most of the patents granted by the more industrial countries of the world and many technical publications, but preliminary searches are as a general rule restricted to domestic patents contained in the most pertinent Patent Office classes. The reasons is that it is often less expensive to file an application than to make a thorough and exhaustive search. In many instances, investigations are so cursory as not to reveal the closest and most pertinent prior art. As a result, inventors are frequently disappointed by having their applications rejected, or their patents invalidated, on references that should have been uncovered in the preliminary search.

Search Should Precede Research

The logical time for making the prior art investigation is not after the invention has been made, but before the actual research work on a given problem has been started. Such a search should also be made before acquiring an interest in an invention, whether patented or unpatented, and before deciding what course of action to take in a threatened infringement suit.

A search before serious work is begun on a new development will enable the research worker to start where his predecessors left off and may prevent him from wasting his energy in the duplication of previous effort. It will furnish invaluable information as to the state of the art, show what mistakes to avoid, and suggest improvement. It will also uncover subject matter that may be freely used; *i. e.*, disclosures

of foreign and expired patents and of patents dedicated to the public, as well as the unclaimed subject matter of domestic patents. It will furthermore show what is protected by live patents and thus enable the research worker to avoid devices and processes that may lead to expensive infringement suits. Often it is possible to obtain such patents, especially if they are not being worked, for a nominal sum and thus procure a ready-made entrance into the field. In any event, a thorough search serves to indicate the tendency for future development and may be utilized to guide research work so that it will be directed away from fields that are impeded by hostile patents and into channels most likely to bring productive results.

Extent of the Search

The investigation should not be limited to devices that have actually been on the market. Until very recently, engineers were exceedingly slow in taking up new ideas for the improvement of their fields. Hence many valuable ideas disclosed in patents and printed publications have been overlooked by inventors and engineers and have therefore had little or no effect on the arts. Frequently one of these ideas is rediscovered, and a search proves it to be old. The patent records in Washington constitute a mine of valuable information, and in a great many instances are the only source of information about these neglected inventions. In any event, the patent literature affords the most thorough and complete history of the technical arts. Usually patents contain the first published knowledge of a subject and are often years in advance of other technical literature.

An investigation may well start with textbooks and technical articles covering the art in question. In this manner it is possible in a relatively short time to gain a comprehensive history of the development of the art, which will not only disclose basic patents but will also indicate what foreign patented art offers the most likely field of investigation. References to textbooks and periodical literature may be obtained from such valuable reference works as *Chemical Abstracts, Industrial Index, Engineering Index,* and West and Berolzheimer's "Bibliography of Bibliographies on Chemistry and Technology." A few industries are fortunate in being provided with comprehensive bibliographies. Undoubtedly the best of these is West's "Bibliography of Papermaking," sponsored by the Technical Association of the Pulp and Paper Industry. By the aid of one or more of these works the research worker may find the key to excellent patent reviews covering particular arts, of which too few have been published in English.

The search through the technical literature may well be made by the research worker himself, as he is usually familiar with his own art and its nomenclature. The investigation of the patented art should be left to patent attorneys and competent searchers versed in the language of patents and the Patent Office system of classification. The file wrappers and contents of the most pertinent patents, *i. e.*, the official records of the Patent Office prosecution, should also be studied. Much valuable information as to the state of the art and the scope as well as probable validity of issued patents may be gained in this manner.

The prior art search cannot be made to extend to pending patent applications, as they are preserved in the strictest secrecy. And, since many important applications are kept pending for years, the most exhaustive and thorough search is necessarily incomplete. However, since patents are as a general rule issued much more promptly abroad than in this country, it is often possible, by making a search of the recent foreign patented art, to gain some idea of the subject matter of pending applications.

Caution as to Statements in Technical Literature

Assertions in technical literature, unless their truth be obvious, must not be accepted without verification. Especially is this so in the case of patent specifications. Inventors, in their anxiety to obtain patents of the greatest possible breadth or scope, are inclined to insert into the specifications of their applications statements having little or no foundation in fact as well as conclusions based upon insufficient experimental data. Even the late wizard of Menlo Park was subject to this failing. Referring to one of his many patents, the Court of Appeals of the Second Circuit in General Electric Company v. Nitro Tungsten Lamp Company, 1921 C. D. 249; 282 O. G. 195; 266 Fed. Rep. 994, had this to say:

"To us it seems fairly certain that both the commercial and the theoretic art had been put on the wrong road by Mr. Edison through the disclosure of his Patent No. 274,295, when in 1883, he proposed to fill a carbon-filament bulb with an 'inert gas,' viz., nitrogen, at a pressure of about two-thirds of an atmosphere, and stated, as one of the means of his hoped-for success that—the filament before carbonization may be reduced to a smaller cross-section than usual heretofore in order to produce reduction of radiating surface. This was unquestionably wrong . . ."

It must also be borne in mind that many patents are taken out by the so-called "arm-chair" inventor. This type of individual makes it a practice to seek patent protection on every conceivable variation and application of newly developed devices and compositions on mere specu-

lation, in order to preempt without delay or expense of experimentation something which he hopes may some day form the basis of a valuable patent. And, unfortunately, the Patent Office has neither the time nor the facilities to ascertain the truth or accuracy of statements made in applications submitted for its consideration. As a consequence, many patents have been granted which are utterly impractical and teach little or nothing.

Then again, the fact that a study of the prior art appears to indicate that a certain problem had been repeatedly investigated without particular success must not be taken as proof that the problem cannot be solved. Frequently a successful solution requires the discarding of preconceived notions and a departure from the beaten path. And, as is well known, workers in an art have a decided tendency to cling slavishly and tenaciously to prior art teachings. It is not surprising, therefore, that many problems are solved by outsiders and by those who do not have too detailed a knowledge of the art. They are, as a general rule, free of the traditions and inhibitions that hamper the thinking of men on the job. However, this is no reason for not making a full and detailed study of the prior art before undertaking the solution of a problem. Lack of information as to the state of the art, as has been pointed out, invariably leads to a waste of effort due to the duplication of previous work.

In this connection, it is to be noted that it requires a considerable amount of good judgment and a fine sense of discrimination to sift from the chaff of prior-art teachings the relatively few grains of worth while information. Also that it requires a great deal of moral courage and enterprise to break away from a prior-art method or device having but limited practical possibilities and resort to one based upon a principle previously considered impossible or preposterous.

Analyzing the Invention

The first step in determining the scope of an invention is, as has already been pointed out, an exhaustive search of the prior art. With the results of such an investigation before him, the inventor is in a position to view his invention in its broadest aspects and to ascertain the essential characteristics that distinguish his device or process from those disclosed in the prior art as well as to determine the underlying principle of his invention. To do this, he must, as far as is possible in view of the prior art, disregard the specific peculiarities or form of his device and look upon it not as the invention itself, but as merely one of the many possible forms in which his inventive concept may be embodied. The inventor should also endeavor to single out the element or group of ele-

ments to which can be ascribed the new or modified result produced by the invention. These elements will hereafter be termed the primary factors of the invention, for they are the effective causes of the desired result. The remaining elements provide the operative environment for the essential elements or primary factors and are, hence, termed secondary factors or dispensable elements.

In carrying out this process, the inventor must regard the elements of the device not as gears, levers, switches, resistances, etc., but as means to perform their functions. This will also enable him to determine which elements may be omitted, modified in form, or replaced by some equivalent instrumentality. A simple expedient is to set down the elements of the device in a single vertical column and mark down opposite each element its function. Some prefer to express the function in the form of a means clause, in which case one element or a group of elements which performs a unitary function, *i. e.*, a subcombination, may be expressed as a single means. A comparison of the list with the prior-art references uncovered in the Patent Office search serves to indicate whether the essence of the invention resides in one or more new elements or in a new arrangement of several old elements.

The next step is to ascertain to what extent the arrangement or relationship of the elements may be varied without departing from the underlying principle governing their operation and what changes in the arrangement of the elements may be necessary in order to modify or replace one of the primary factors. This serves to establish the essential physical conditions under which the invention may be practiced. Finally, the inventor should take steps to determine how the invention may be applied in various fields.

The analysis of the invention and the determination of its scope may require extensive engineering and research with the assistance of competent technicians and consulting experts. The assistance of consultants is preferable to that of workers in the art, for consultants are generally possessed of an independence of viewpoint which enables them to view an invention in its true perspective. The failure to analyze an invention properly has frequently resulted in a broad invalid patent or in a narrow patent that can be easily evaded by a competitor. Especially is this true of chemical inventions.

Analyzing Chemical Inventions

The mechanism of determining the broadest aspects of a chemical invention does not differ essentially from that of any other invention, but it requires a thorough knowledge of chemical nomenclature and classifica-

tion as well as of chemical reactions. The procedure may well be illustrated by means of Patent No. 1,731,485.

The patent discloses a method of producing a rubber composition by treating rubber with one of a number of compounds including sulphuric acid, sulphonic acid, and sulphonyl chlorides. It is very unlikely that the inventors (Geer and Fisher) hit upon all these reagents at the same time. Probably they first found that a desirable composition was produced by treating rubber with sulphuric acid. Sulphuric acid may be classed broadly as an acid and more specifically as a mineral acid. A few experiments were sufficient to indicate that the property of sulphuric acid which enabled it to react with the rubber in the desired manner was not characteristic of all acids or of mineral acids only. A less skilled chemist than the inventors would probably have concluded that the reaction was individual to sulphuric acid and filed the patent application under that theory. But the inventors knew the sulphuric acid can further be classified with compounds containing the SO_2 radical, for its structural formula is OH—SO_2—OH. The inventors, therefore, tried out a reasonable number of compounds that can be classified under the general formula R—SO_2—X and it was, then, merely a matter of laboratory routine to determine that any compound falling under the general formula would serve provided R represents an organic radical or an hydroxy group and X stands for chlorine or an hydroxy group.

Settling Question of Inventorship

A patent to be valid must have been granted on the application of the actual inventor. Many patents have been invalidated because a person who had no part in creating the new device either filed the application in his own name or joined with the true inventor in signing the papers. It is, therefore, of considerable importance to make certain that the person who is to sign the application papers is in fact the inventor. If the invention resulted from the efforts of several workers, their relationship and the parts which they each contributed to the final result should be carefully analyzed to ascertain which of them must sign the application as inventors.[1]

If there is a doubt as to whether a person is a joint inventor, the safe rule is to have him join in the filing of the application. This prevents him from later upsetting the patent by proving that he should have been included. If it should later appear that he should not have been joined as an applicant, his name can be eliminated from the application with

[1] See "The Applicant for a Patent," THE CHEMIST, April, 1932, Page 207.

his permission, provided it has not yet matured into a patent. On the other hand, the omission of a joint inventor's name from an application cannot be supplied or corrected, except by filing another application. And it often happens that by the time the mistake is discovered, the device of the invention has been in public use or on sale for more than two years, in which case it is too late to file another application.

Choosing the Patent Attorney

The inventor, or the one to whom he assigns his invention, may file and prosecute the application in the Patent Office. However, the applicant, unless he is intimately acquainted not only with the art to which the invention relates but also with patent law and procedure, should not attempt to obtain his own patent. For, to secure a patent is one thing and to secure a patent that will effectively protect the inventor to the full extent of his contribution to the art is quite another. The value of a patent as judged by its capacity to protect the invention depends so much upon the care and skill with which the application has been prepared and prosecuted that it has been truthfully said that the skill and experience of the one prosecuting the application often plays a more important rôle than the merits of the invention itself. If the patent is skilfully drafted, it may dominate an entire industry. If not, it may be valueless, being either invalid or so narrow as to be easily evaded. In any event, a large proportion of patent cases that come before the courts are lost not in the courts but in the Patent Office during their prosecution.

In this connection the Supreme Court, in the case of Topliff v. Topliff, 145 U. S. 156; 1892 C. D. 402; 59 O. G. 1257, made the following significant statement:

"The specification and claims of a patent, particularly if the invention be at all complicated, constitute one of the most difficult legal documents to draw with accuracy, and in view of the fact that valuable inventions are often placed in the hands of inexperienced persons to prepare such specifications and claims, it is no matter of surprise that the latter frequently fail to describe with requisite certainty the exact invention of the patentee, and err either in claiming that which the patentee had not in fact invented, or in omitting some element which was a valuable or essential part of his actual invention."

For the protection of inventors, the Patent Office maintains a register of patent attorneys entitled to represent applicants before the Patent Office in the presentation and prosecution of applications for patent (Rule 17). On this list are entered the names of all persons, not necessarily lawyers or members of the bar, who have satisfied the Commis-

sioner of Patents that they are of good moral character and of good repute and possessed of the necessary legal and technical qualifications to enable them to render applicants valuable service in the prosecution of their applications before the Patent Office. The prospective applicant will do well to assure himself that the attorney who is to prepare and prosecute the application is registered and in good standing before the Patent Office. In case of doubt, the inventor is advised to inquire of the Patent Office as to the standing of his prospective attorney. Such inquiries are answered very promptly and constitute the only infallible way in which an inventor may avoid retaining an unregistered attorney.

Qualifications of Competent Attorney

It must be pointed out that the fact that an attorney is registered is no assurance that he is thoroughly qualified to handle every type of patent application. The field of invention is so vast, covering as it does all the fields of human endeavor and constantly bringing into existence new ones, that it is impossible for one person to become expert in all the arts. It is, however, not too much to expect one person to have such a comprehensive knowledge of patent procedure and of the fundamental principles of the important branches of science as to be able to cooperate intelligently with inventors in widely separated fields of invention in securing adequate patent protection. Hence, an inventor should not select an attorney without an engineering training of the best quality. The tremendous development in chemistry, electricity, and mechanics has long outgrown the intellectual grasp of a person without technical training.

In addition, a competent patent attorney must be capable of digging to the very bottom of a mass of detail, statistics, and miscellaneous ininformation and bring to light the essential and vital principle. He must have the unerring ability to grasp the inventive concept from the inventor's description and sketches; he must have the infallible instinct to ask the questions which reveal the fundamentals of the matter being investigated. Furthermore, he should have sufficient vision and imagination to see all the possibilities of the invention. Finally, he must possess enough literary ability and skill to describe and define the invention accurately and adequately and in such plain terms that the Patent Office and the courts will have no difficulty in getting at its every essence. It is evident from what has been said, that a patent attorney must possess skill, judgment, and learning that are, to say the least, unusual. In fact, it can safely be said that there is no other branch of the law that

requires a greater mentality, a wider knowledge, or greater skill and training than that of patent law.

Having selected an attorney in whom he can have the utmost confidence, the inventor should impart to him by means of sketches, written descriptions, etc., as thorough an understanding of the invention as possible. He should also make available to him the results of all investigations and research. Moreover, the inventor should cooperate with his attorney at all stages of the prosecution of the application in pointing out to the Patent Office wherein the invention distinguishes from prior devices and practices. The securing of a valid patent of the broadest possible scope requires that the skill and patent experience of the attorney be supplemented by the technical knowledge of the inventor and by the results of experimental research. Both the attorney and the inventor must cooperate to the fullest extent in studying the invention and all its possibilities. Without the full-hearted cooperation of his client, the attorney can do very little toward obtaining adequate patent protection.

Selecting Illustrative Embodiment

Except in the case of patents of very narrow or restricted scope, the device described in the specification is considered as only one of several possible forms in which the inventor may embody his inventive concept. The invention need be disclosed only in its simplest aspects. Hence, the prospective applicant will do well to select for illustration the simplest possible form of device which incorporates the gist or essence of the invention. The form of device selected for illustration does not have to be practical from a commercial point of view, provided it actually and mechanically performs the important function by which it makes the substantial changes claimed for it in the art. To select intelligently the illustrative embodiment of his invention, the inventor should carefully analyze the invention in the manner previously pointed out. This, of course, requires a thorough familiarity with prior-art constructions and practices.

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National Council

The one-hundred and fourth meeting of the council of The American Institute of Chemists was held at The Chemists' Club, New York, N. Y., on Thursday, September 28, 1933, with President Henry G. Knight presiding.

The following councilors and officers were present:

Messrs. Breyer, Crossley, Jackson, Moody, Morgan, Neiman, Taggart, and Zons. Mr. Edward L. Gordy, editor of THE CHEMIST, was also present.

Mr. Breyer presented the report of the committee on ethics. The report was referred back to the Committee for further examination and report.

The following new member was elected:

FELLOW: Gustavus John Esselen, *President*, Gustavus J. Esselen, Inc., 73 Newbury Street, Boston, Mass.

Raised from Junior to Associate: John Frank Lontz.

The question of the advisability of the Institute preparing and filing a code for chemists was discussed at length. The Secretary reported the results of his interview with Mr. Concannon upon this subject, the latter recommending that a code be prepared and filed as a basis for codes filed by other chemical societies, though it is probable that it would not be acted upon at the present time.

The Secretary read a letter from Mr. Baëza relative to this subject, and also presented a recommendation from the New York Chapter to the effect that The American Institute of Chemists offer to serve in an advisory capacity to the NRA in all matters relating to chemists.

Upon motion made and seconded, this

recommendation was adopted and Miss Wall was authorized to prepare a proper resolution.

The matter of a code was referred back to the code committee; and a special meeting of the National Council was called for Friday, October 13th, in order to consider an additional report from the code committee.

It was decided that the regular meetings of the National Council be held on the third Thursday of each month.

The Secretary called attention to a former suggestion by the Board of Estimate and Apportionment to drop seven chemists from the Bureau of Engineers, Borough of Queens, and stated that the Institute had filed a letter of protest with each member of that board, and that he had been informed that thus far the chemists had been retained.

HOWARD S. NEIMAN, *Secretary*

Washington Chapter

A meeting of the Washington Chapter was held Friday, September 22, 1933, at 8 P. M., in the board room of the Cosmos Club.

Dr. James F. Couch addressed the meeting on the "Requirements for a Fundamental Education in Chemistry." The address was followed by an open discussion of the subject and by a business meeting.

J. B. MARTIN,
Reporter

New York Chapter

A meeting was held on September 22nd at The Chemists' Club, with Chairman Ross A. Baker presiding. The meeting was preceded by a dinner attended by sixty members and guests.

About two hundred were present for the address of the evening, by Charles C. Concannon, F.A.I.C., chief of the chemical division of the U. S. Bureau of Foreign and Domestic Commerce. Mr. Concannon's speech on "NRA and the Chemist" is printed in full in this issue of THE CHEMIST.

Mr. Concannon was followed by E. E. Millard, speaking for the electrical testing laboratories, and by John Morris Weiss, F.A.I.C., speaking for the consulting chemists.

NEWS

W. J. Baëza, F.A.I.C., director of the industrial research company, New York, is now retained by the National Guarantors Corporation, 122 East 42nd Street, New York City, as technical director. He is in charge of all physical, chemical, and field tests made on the products appraised by this company.

The National Guarantors Corporation is a disinterested organization of leaders in many industries, which tests the qualities of products and machines, and makes an unbiased confidential report for purchasing agents, manufacturers, and consumers.

Scuffability of Shoes

A broad testing program is being conducted to supplement practical wearing tests on "Vici Special" leather, developed by C. H. Geister at Mellon Institute. It was found highly desirable to study this novel leather from the standpoint of scientifically controlled laboratory tests.

According to the report on the scuffability tests completed very recently, the new leather has greatly increased toughness against scuffing and wearing abrasion. It needs no dressing in the shoe factory or while in service, as it will polish by simple rubbing, after cleaning with soap and water. It is permanently lubricated by an impregnation in a radically different tanning process, and this impregnation supports the fibers against fatigue. A remarkable feature of the leather is that it is waterproofed without interference with the natural breathing qualities.

The scuffing resistance is measured by a drum apparatus that throws shoes loaded with sandbags violently against the abrasive and drum.

The results are said to confirm comprehensive practical wearing trials. Other physical properties of Vici Special are being studied, and the results will be described later. Copies of the report on the scuffability tests can be obtained gratis from Mellon Institute, Pittsburgh, Pa.

Research for Profits

For textile profits under NRA the October issue of *Textile Research*, official publication of U. S. Institute for Textile Research, states that "The new scientific and economic textile knowledge that has been developed during recent years must be applied, and there must be adequate research to develop new scientific and economic knowledge. Few industries have done less than the textile industry in the utilization of scientific research, and few industries, therefore, can expect to profit to the same degree from the results of properly directed and adequately financed research."

W. T. Read, F.A.I.C., is the author of "Industrial Chemistry," recently published by Wiley.

W. W. Winship, F.A.I.C., has just returned from a business trip to England and to the meeting of the Canadian Chemical Association.

Charles E. Mullin, F.A.I.C., is the author of an article on "Changing the Fertilizer Markets in Japan," in the September number of *Chemical Markets*.

C. C. Concannon, F.A.I.C., has sailed for England.

Lewis H. Marks, F.A.I.C., has become president of the Continental Distilling Corporation.

J. W. H. Randall, F.A.I.C., is abroad.

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